A RE-EVALUATION OF THE RELATIONSHIPS OF *HELIX* (*THALASSIA*) *GAYNDAHENSIS* BRAZIER, 1875 (MOLLUSCA, PULMONATA, HELICARIONIDAE)

JOHN STANISIC

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Iredale (1937) listed *Delinitesta gayndahensis* (Brazier, 1875) under the family Flammulinidae, a group of endodontoid snails recently placed in the Charopidae by Solem (1983). Iredale's assessment was based on gross conchological detail. Utilising scanning electron microscopy this assessment is re-evaluated. Results suggest that *D. gayndahensis* is a member of the limacacean family Helicarionidae. A redescription of the species is presented.

☐ *Mollusca, Pulmonata, Helicarionidae, Delinitesta gayndahensis (Brazier, 1875), Relationships, Redescription.*

John Stanisic, Queensland Museum, PO Box 300, South Brisbane, Queensland 4101, Australia; *24 July, 1987.*

Iredale (1937) placed a number of problematical genera within the family Endodontidae *sensu lato*. In several cases the placement was purely a matter of convenience and open to many questions. It has already been shown that some of these genera belong to quite different family units. Solem (1958) identified the north Queensland *Theskelomensor* Iredale, 1933, as a helicarionid taxon, while Solem (1959) transferred *Torresiropa* Iredale, 1933, to the Rhytididae as a subgenus of *Ouagapia* Crosse, 1894. *Delinitesta* Iredale, 1933, (type species: *Helix* (*Thalassia*) *gayndahensis* Brazier, 1875) and *Queridomus* Iredale, 1937, (type species: *Helix* (*Conulus*) *grenvillei* Brazier, 1876) represent two further questionable placements.

A study of the Charopidae of southeast Queensland subtropical rainforests has made it necessary to review the relationships of *Delinitesta gayndahensis* (Brazier, 1875). The status of *Queridomus grenvillei* (Brazier, 1876) will be considered elsewhere.

SYSTEMATIC REVIEW

All specimens used in this study were collected late last century. The lack of recently collected material is most likely a collecting artefact because related field work in south-east Queensland over the past 15 years has been concentrated in the moist, coastal rainforests. The specimens listed in this study represent all known material of *D. gayndahensis* and are in the collections of the Australian Museum (hereafter AM) and South Australian Museum (hereafter SAM).

Genus **Delinitesta** Iredale, 1933

Delinitesta Iredale, 1933, *Rec. Aust. Mus.* **19**(1): 54; Iredale, 1937, *Aust. Zool.* 8(4): 321.

DIAGNOSIS

Shell medium in size, spire only slightly elevated, umbilicus very small, whorls about 5, normally coiled, last descending. Apical sculpture of moderately spaced, incised spiral lines. Post nuclear whorls with weak radial growth ridges crossed by numerous very closely spaced wavy incised spiral lines. Body whorl with prominent cord-like keel. Anatomy unknown.

TYPE SPECIES

Helix (*Thalassia*) *gayndahensis* Brazier, 1875, by original designation.

NOMENCLATURE AND PREVIOUS STUDIES

Brazier (1875) included *Helix gayndahensis* in the section *Thalassia* Albers, 1860. This was a contemporary catch-all for species with helicoid shells that had few or no sculptural features. Gude (1911) substituted *Nitor* for *Thalassia*, pointing out that the latter had priority in ornithological nomenclature. Hedley (in Hedley and Musson, 1892) considered that conchologically, the species came closest to *Hedleyoconcha* Pilsbry, 1893, (type species: *Helix delta* Pfeiffer, 1856). Iredale (1933) felt

that neither allocation was satisfactory and decided that the combination of shell texture, '. . . quaint keeling, and rounded base . . .' were characters meriting generic distinction. However, the reservations lingered, and Iredale (1937) listed the species alongside *Hedleyoconcha* in the Flammulinidae while expressing serious doubt over its relationships.

Delinitesta gayndahensis (Brazier, 1875)
(Fig. 1a–f, Table 1)

Helix (*Thalassia*) *gayndahensis* Brazier, 1875, *Proc. Linn. Soc. NSW.* **1**: 2 — Gayndah, Queensland; Hedley, 1901, *Proc. Linn. Soc. NSW.* **26**: 16, pl. 2, figs. 17–19.

Charopa (*Thalassia*) *gayndahensis* (Brazier), Tryon, 1886, *Man. Conch.* **2**: 215.

Flammulina gayndahensis (Brazier) Cox, 1909, *Alphabetical list of Australian Land Shells*, Part 1, p.32.

Delinitesta gayndahensis (Brazier), Iredale, 1933, *Rec. Aust. Mus.* **19**: 54; Iredale, 1937, *Aust. Zool.* **8**(4): 321.

Type Material

Helix gayndahensis was described from material collected by George Masters, the first Curator of the Macleay Museum, Sydney. Unfortunately, no holotype was designated. Ponder and Stanbury (1972) identified four syntypes in the collection of the Macleay Museum and subsequently transferred them to the Australian Museum (AMA.119). However, the collections of the Australian Museum also include a number of other specimens which come from the type locality. It is highly probable that all these 'Gayndah' specimens are part of the original type lot collected by Masters. Herein all those specimens which could be associated with either George Masters or John Brazier were considered for selection of the lectotype. The lectotype comes from Brazier's collection and the label data includes habitat and publication details in his handwriting.

Material Examined

Lectotype: AMC.55443, 'found on the trunks of trees under bark', Gayndah, Queensland — here designated.

Paralectotypes: AMA.119 ('on trees under bark', ex Brazier 4 specimens), AMC.101150 (ex Brazier, 1 specimen), AMC.10699 (Figd. Hedley, 1901, 1 specimen), AMC.142428 (Helms coll., ex Brazier, 3 specimens) — all from the type locality.

Other Material: Gayndah (9 specimens, AMC.95837, AMC.63682; 3 specimens, Cox coll., AMC.142429); Maryborough (1 specimen, Cox coll. AMC.142430); Eidsvold (3 specimens, SAM D.17961, identified by C. Hedley).

Description

Shell medium in size, diameter 7.66mm, with 5 + normally coiled whorls, last whorl descending. Apex and spire elevated. Spire protrusion 0.125 times body whorl width. Height 4.43 mm, H/D ratio 0.58. Protoconch of 1¾ whorls, sculptured with about 20 incised spiral striae regularly notched along their length. Postnuclear sculpture of numerous, very close wavy incised spiral lines, interrupted by weak radial growth ridges. Body whorl with a prominent peripheral cord-like keel and a noticeable supraperipheral sulcus, flattened above and rounded below the keel. Lip simple with columellar deflection slightly covering umbilicus. Parietal callus weakly developed, pustulose, white. Umbilicus narrow, width = 0.64 mm, D/U = 12.0. Columella vertical, aperture subovate. Sutures flat. Colour creamy yellow-horn.

Comparative Remarks

The combination of small size, subglobose shape, macroscopically featureless shell and

TABLE 1: Variation in *Delinitesta gayndahensis* (Brazier, 1875)

REG. NO.	NUMBER OF SPECIMENS	HEIGHT (mm)	DIAMETER (mm)	H/D	D/U	WHORLS
AMC.101150	1	4.57	7.43	0.62	9.29	4½
AMC.10699	1	4.57	7.09	0.65	8.86	4½+
AMC.63682	4	4.83 (4.69–5.49)	7.76 (7.20–8.57)	0.62 (0.60–0.65)	9.69 (9.00–10.71)	5 (4⅞–5⅛+)
AMC.142430	1	4.69	8.00	0.59	10.00	5
AMC.55443 (Lectotype)	1	4.43	7.66	0.68	12.0	5+

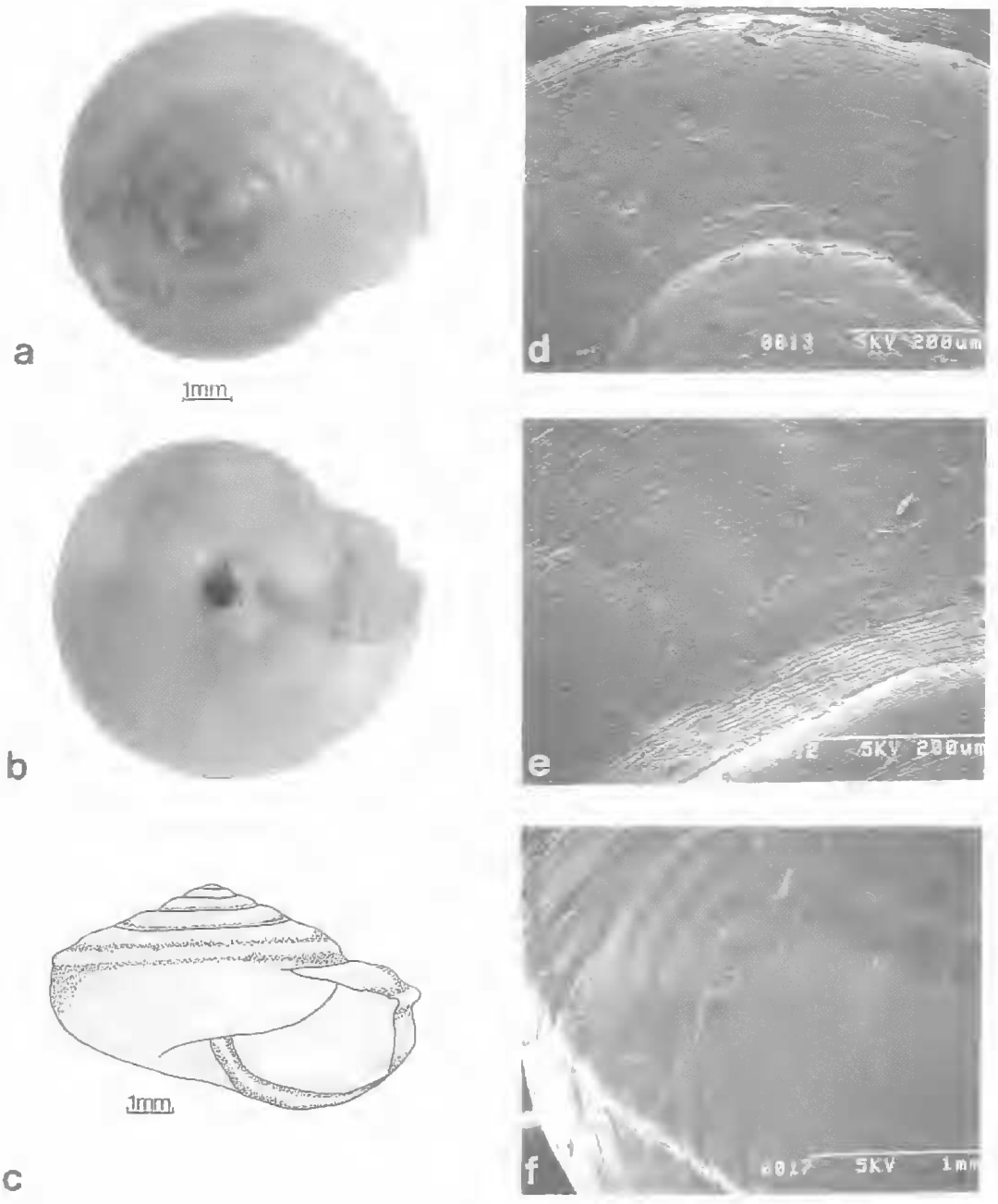

FIG 1. Details of the shell of *Delinitesta gayndahensis* (Brazier, 1875). (a–c) Lectotype, AMC.55443, (d–f) Gayndah, AMC.142429. (a,b) top and bottom views; (c) side view; (d) protoconch sculpture; (e) adult sculpture; (f) keel. (Scale lines as shown).

cord-like keel effectively distinguish *D. gayndahensis* from other Queensland land snails. *Theskelomensor creon* Solem, 1958, and *Theskelomensor lizardensis* (Pfeiffer, 1863), two helicarionids from north Queensland, possess peripheral keels but are easily separated from *D. gayndahensis* by their smooth protoconch, trochoidal shape and wide umbilicus. *Tarocystis*

responsivus (Hedley, 1912) from southern Queensland agrees with *D. gayndahensis* in overall shell shape and sculpture, but lacks the peripheral keel. Species of *Nitor* Gude, 1911, have similar sculpture but possess a very simple keel and have the whorls flattened above the periphery.

Distribution and Habitat

D. gayndahensis is known from Gayndah, Eidsvold, and somewhat more questionably, Maryborough. The area around Gayndah is peppered with small rocky outcrops supporting semi-evergreen vine thickets which are home to a comparatively diverse land snail fauna and it is probable that *D. gayndahensis* occurs in these thickets.

DISCUSSION

The typical pattern of sculpture found in the Charopidae is a combination of strong radials and a complex microsculpture of fine radial riblets and crowded spiral cords (Solem, 1983). Although this sculpture may be secondarily reduced in some species or even modified, the spiral grooves and notches exhibited by *D. gayndahensis* (Fig. 1d, e) are not present in any charopid hitherto examined. To my knowledge the only Australian charopid taxa with incised spiral lines are '*Oreokera*' *corticicola* (Cox, 1866) from the coastal rainforests of northern New South Wales and the Border Ranges, and two undescribed species from the Miriam Vale area in southern Queensland. However these taxa have quite different sculpture on the protoconch and adult whorls, flammulated shells and lack any trace of a peripheral keel. Moreover the spiral lines are simple grooves and do not show the 'notching' present in *D. gayndahensis*.

On the other hand, the geographically proximate helicarionid genera *Tarocystis* Iredale, 1937, *Dendronitor* Iredale, 1933, and *Nitor* Gude, 1911, share this sculptural feature with *Delinitesta* (Stanisic, unpublished). Solem (1982) described a similar pattern of incised spiral lines and notches in species of *Westracystis* Iredale, 1939, from northern Australia. Unfortunately the present classification of the Australian helicarionids is chaotic and, while this group is numerically the third largest land snail family in Australia, only a handful of local species have been critically examined (Odhner, 1917; Baker, 1941; Kershaw, 1979, 1981; Solem, 1982). Nevertheless I suspect more detailed studies will show that the relationships of *D. gayndahensis* lie with the species currently listed under *Expocystis* Iredale, 1937, *Tarocystis* Iredale, 1937, and *Melocystis* Iredale, 1937.

Lack of material for anatomical study has restricted the nature of the preceding remarks to conchological comparisons. In spite of this the few sculptural features shown by *D. gayndahensis* are considered sufficient to remove it from the Charopidae (*sensu* Solem, 1983) and place it in the Helicarionidae.

The unusual keel of *D. gayndahensis* (Fig. 1c, f) is a feature found in various groups of extralimital helicarionids such as *Epiglypta* Pilsbry, 1893, and *Dignamoconcha* Iredale, 1944, from Lord Howe Island; *Orpiella* Gray, 1855, from the Solomon Islands; and *Harmogenanina* Germain, 1918, from the Reunion Islands. However, this structure represents a significant departure from the general shell patterns seen among Australian helicarionids and may be a secondary modification associated with the habitat shift to arboreal existence.

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